

# The Truck Engine of the 21st Century

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*Presented by:*

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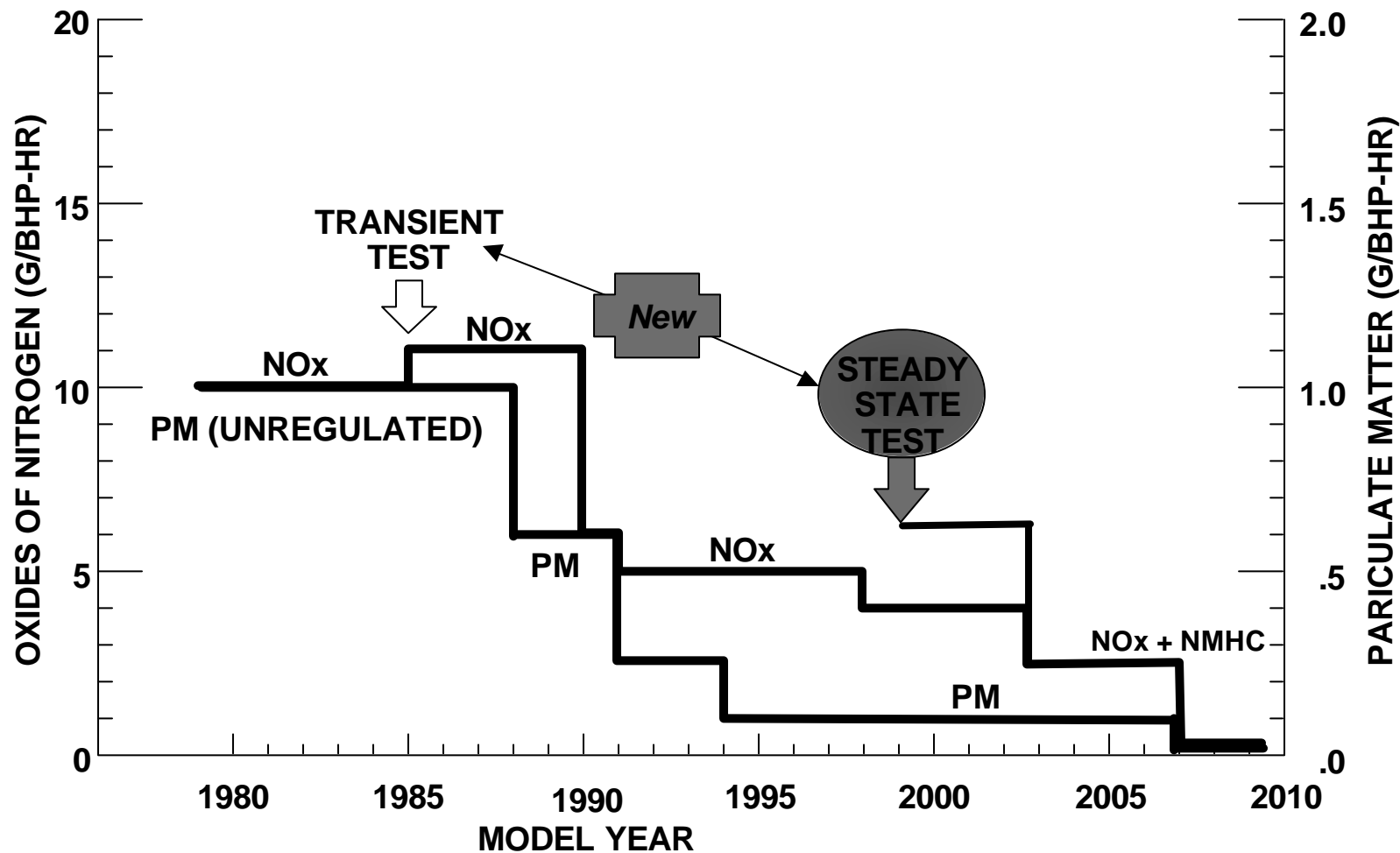
# Diesel Engine Milestones

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- **First Practical Diesel Engine Built by MAN - 1893**
- **Solid Fuel Injection Systems**
  - Bosch Type of Individual Pump - Early 1920's
- **Turbocharging**
  - Early Work of Alfred Buchi - 1911
- **Electronic Control of Fuel Injection**
  - Detroit Diesel 1985 - DDEC



# DDEC was Needed to Meet the Ever More Stringent Emissions Standards



## Less than 10 Years Ago

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- **Fleets were Satisfied with...**
  - **4.5 mpg at 55 to 60 mph**
  - **350,000 Miles to Overhaul**



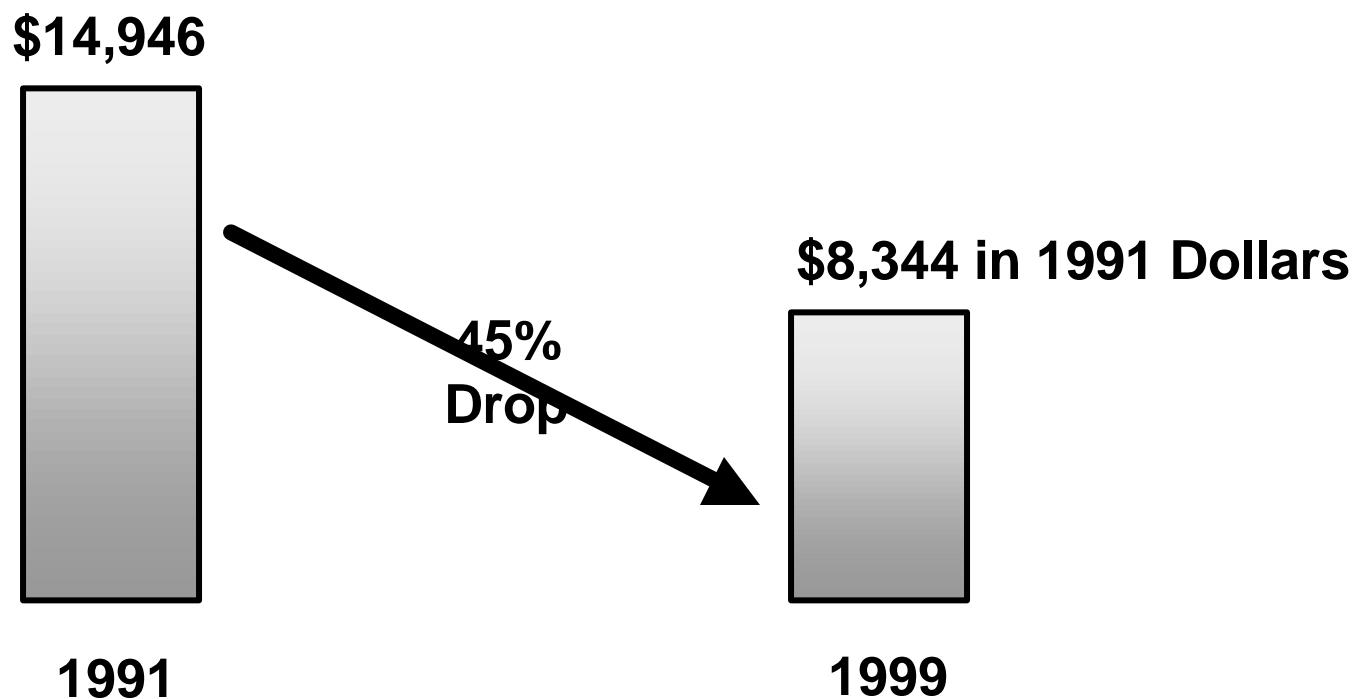
# Today

- **Fleets Want ...**
  - **6.5 to 7 mpg  
at 65 to 70 mph**
  - **1,000,000 Miles  
to Overhaul**
  - **Lower Operating Costs**



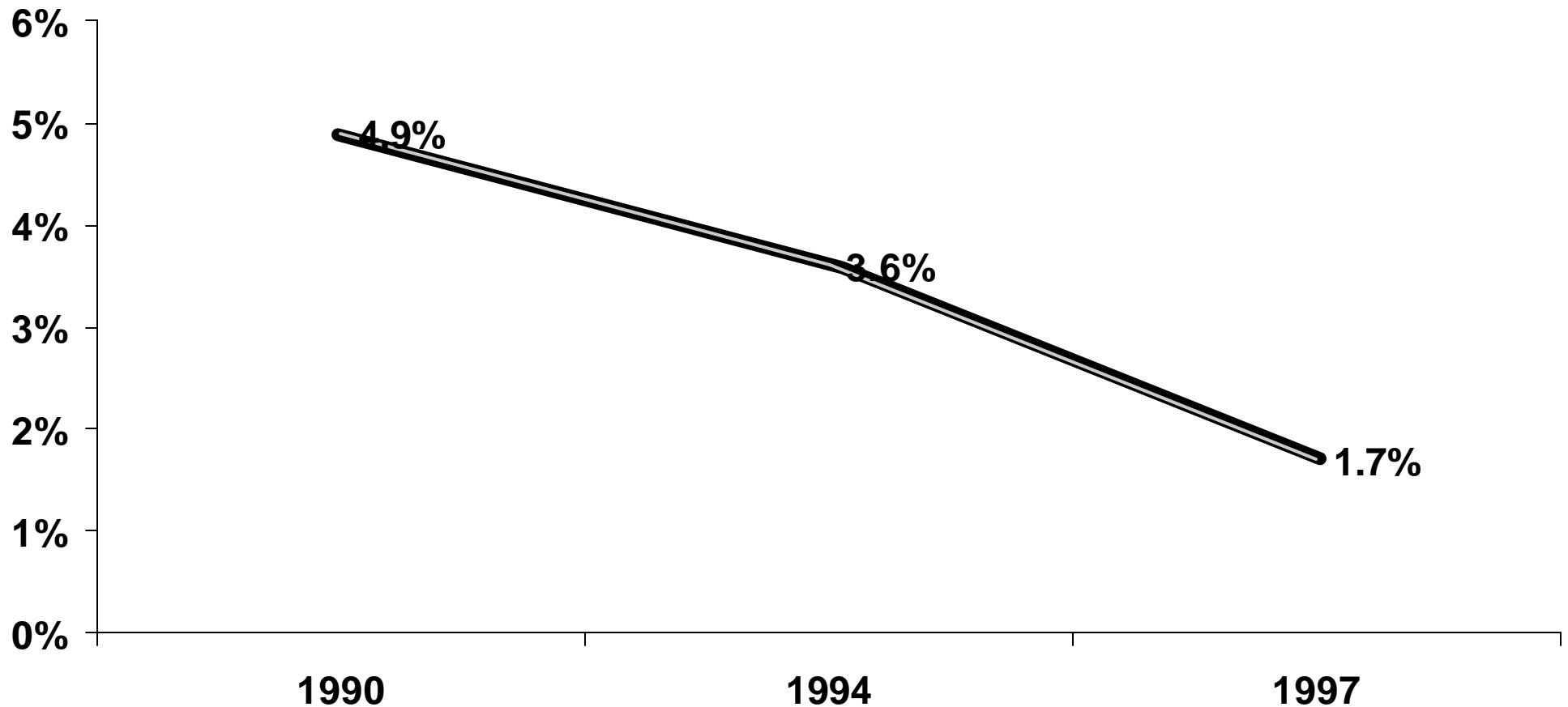
# Class 8 Tractor Parts Consumption

## First Five Years of Use



Source: Mackay & Co.

# Motor Carrier Maintenance Expense As a Percent of Total Expense



Source: Mackay & Co.

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# The “Engine” of the Future

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- **Diesel-Electric Hybrid**
- **Fuel Cells**
- **Reformulated Diesel Fuel**
- **Other Fuels - Methanol,  
Gasoline, Hydrogen**



# The Diesel Engine Remains the Most Thermodynamically Efficient Power Plant and...



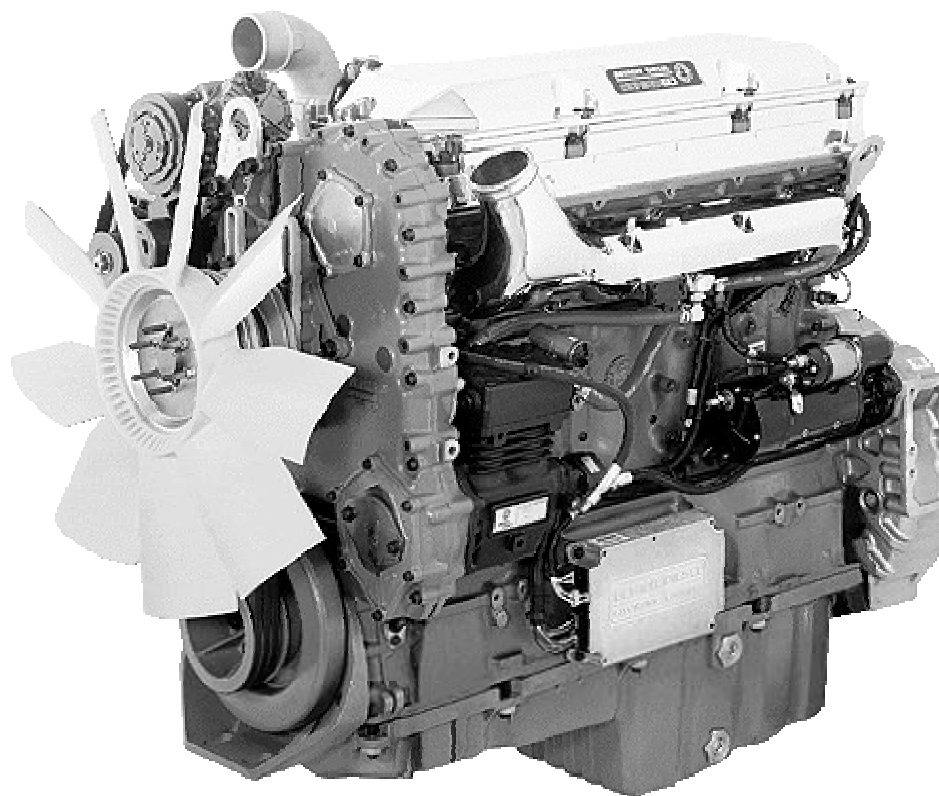
**There is No Advanced Product  
Feature / Benefit Available that is Not  
Already Available on a Series 60**



**SERIES 60**  
**1850**

# Series 60 1850 Engine

**Now Being Demonstrated in Two U.S. Army Trucks**



# Our New Maintenance Alert System

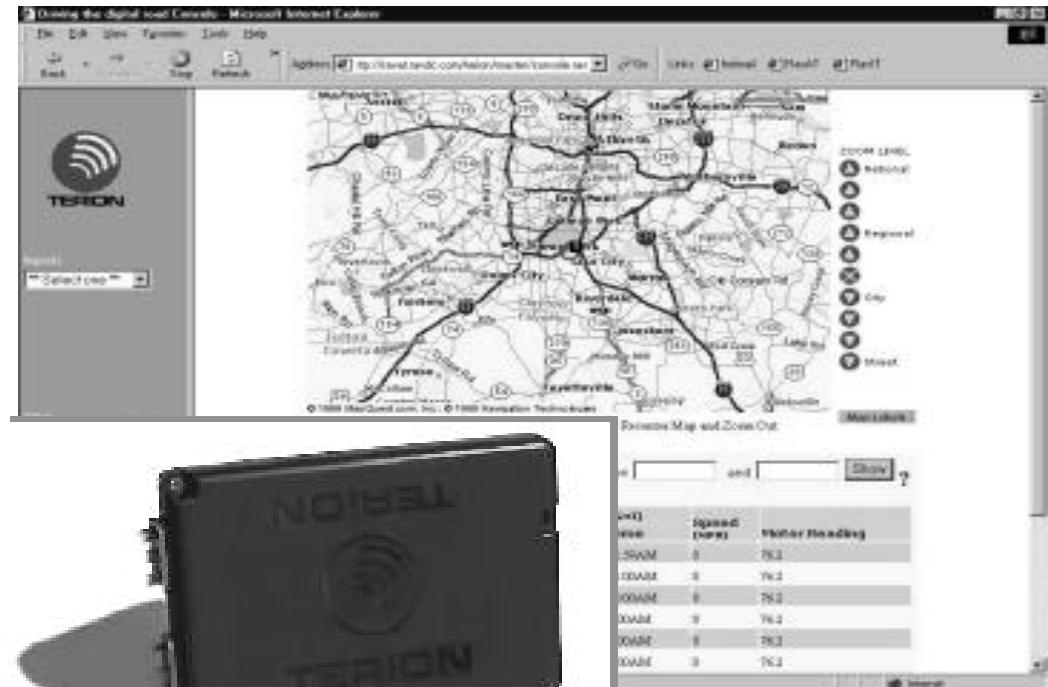




# Corporate Profile

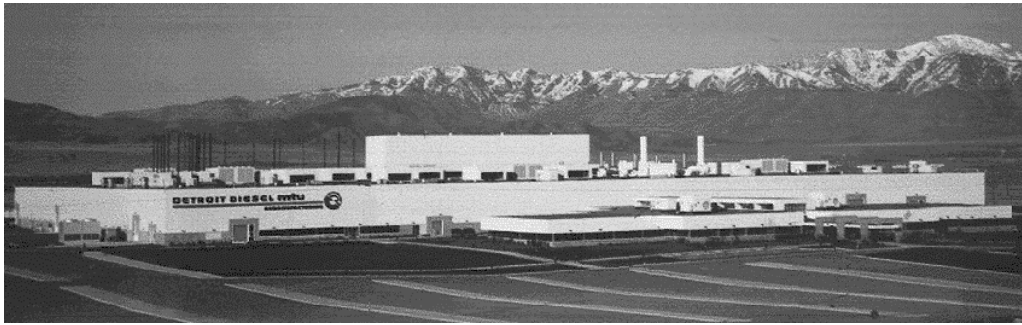
- **DDC Just Invested in Terion**
  - Mobil Messaging
  - Tractor Locator
  - Automated Dispatch System
  - Untethered Trailer Tracking
  - Uses Low Cost, Proprietary FM Frequency in Place of Satellite or Cellular

## FleetView™



# Detroit Diesel Remanufacturing - Facilities

- Revenues - \$200 Million / Employees - 1250



**DDR West - Tooele**



**DDR East - Cambridge**



**DDR North - Grand Rapids**



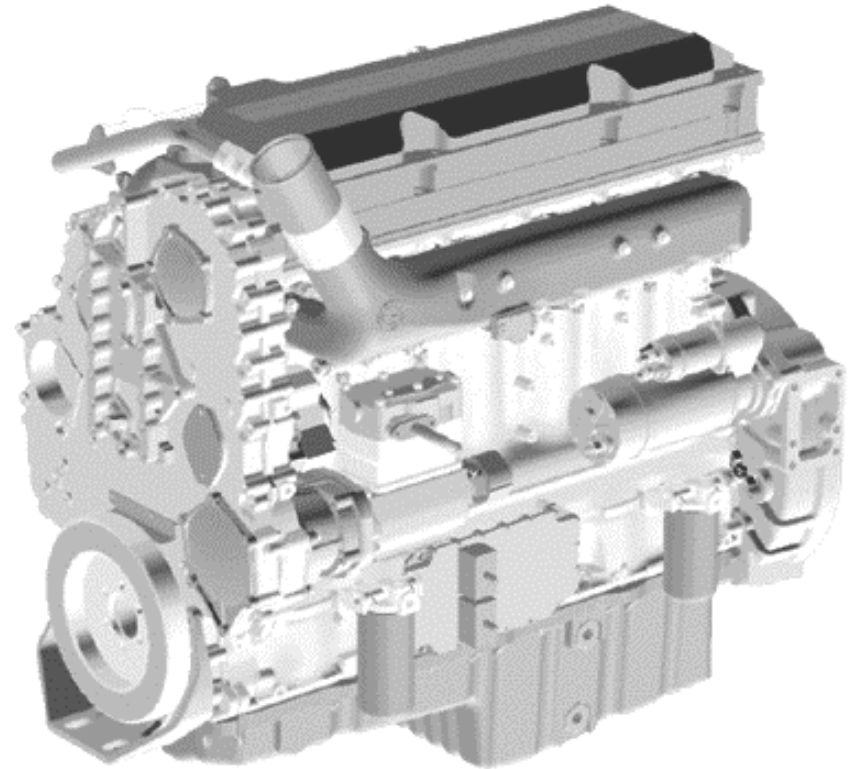
**DDR Central - Emporia**

# Which Engine Will You be Using for the Next Seven Years?



# **It will Be an Enhanced Series 60 Start of Production October 2002**

- **Improved Fuel System**
- **New Braking System**
- **Exhaust Gas Recirculation**
- **New Electronics**
- **New Manufacturing Processes**





# Is This New Technology Proven?

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- **Cooled EGR**
  - DDC Holds a Patent
  - DDC Already has Production Engine with EGR
  - Year 2000 S50 Bus Engine will Include Cooled EGR
- **Common Rail Fuel System**
  - The DELTA and VECTER Engine have Common Rail
  - The DDC/MTU Series 4000 Engine has Common Rail
  - Five DDC Cento Engine Families will have Common Rail in 2000
- **Variable Geometry Turbochargers**
  - Standard on Year 2000 Coach Engines
- **DDEC Electronics**
  - DDEC V will be Our Fifth Generation of Electronics

# What About 2007 and Beyond?

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- **The Diesel Engine will Still Be the Power of Choice, Worldwide, with the Following Enhancements**
  - **Aftertreatment for NOx**
  - **Aftertreatment for Particulates**
- **Both will Require Low Sulfur Diesel Fuel**

# The Diesel Engine After That?

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- **Detroit Diesel has Submitted a Proposal to DOE to Participate in the NZ50 Initiative**

**“Near Zero Emission - 50% Thermal Efficiency”**

- **The Base Engine?**

## The Series 60